



Listing of Claims

1 1. (Currently Amended) A processor implemented data processing method
2 comprising:

3 identifying a first plurality of regionsareas defined by a first corresponding
4 plurality of geometric primitives disposed within a first innermost nested level of a
5 first recursively partitioned/nested geometric structure having at least the first
6 plurality of geometric primitives and a first other geometric primitive disposed in a
7 first immediately preceding outer nesting level of the first innermost nested level,
8 with the first plurality of areas defined by the first plurality of geometric primitives
9 nested within a first other area defined by the first other geometric primitive, the first
10 plurality of regionsareas that corresponding to a first plurality of normalized multi-
11 dimensional data of a first normalized multi-dimensional data space, and the first
12 recursively partitioned/nested geometric structure being corresponding to the first
13 normalized multi-dimensional data space;

14 determining corresponding first graphing values for said first corresponding
15 regionareas within said first recursively partitioned/nested geometric structure
16 determined for said first normalized multi-dimensional data of said first normalized
17 multi-dimensional data space;

18 associating corresponding first visual attributes with said first corresponding
19 regionareas within said first recursively partitioned/nested geometric structure,
20 based at least in part on corresponding ones of said determined first graphing
21 values; and

22 displaying said first recursively partitioned/nested geometric structure, visually
23 differentiating said first corresponding regionareas based at least in part on
24 corresponding ones of said associated first visual attributes; ;

25 wherein said associating comprises for each of said first regions, associating
26 a selected one of a plurality of colored geometric primitives with the region based at
27 least in part on the determined graphing value of the region.

1 2. (Currently Amended) The method of claim 1, wherein each of said first
2 normalized multi-dimensional data of said first normalized multi-dimensional data
3 space comprises a plurality of relative coordinate values, and the method further
4 comprises constructing a polynary string to represent each of said first normalized
5 multi-dimensional data and its corresponding one of said first regionareas within
6 said first recursively partitioned/nested geometric structure in accordance with the
7 relative coordinate values.

1 3. (Currently Amended) The method of claim 2, wherein said constructing of a
2 polynary string to represent each of said first normalized multi-dimensional data and
3 its corresponding one of said first regionareas within said first recursively
4 partitioned/nested geometric structure in accordance with the relative coordinate
5 values comprises selecting a symbol as the next symbolic member of the polynary
6 string based on which of the relative coordinate values is the current highest relative
7 coordinate value.

1 4. (Currently Amended) The method of claim 3, wherein said constructing of a
2 polynary string to represent each of said first normalized multi-dimensional data and
3 its corresponding one of said first regionareas within said first recursively
4 partitioned/nested geometric structure in accordance with the relative coordinate
5 values further comprises reducing the highest relative coordinate value in by an
6 amount (G), upon each selection, and reducing the amount (G) after each reduction.

1 5. (Original) The method of claim 4, wherein the amount (G) initially equals $1 -$
2 F, and thereafter reduced each time by $G*(1 - F)$, where F equals $(n - 1)/n$, and n
3 equals the number of relative coordinate values.

1 6. (Currently Amended) The method of claim 2, wherein said determining of
2 corresponding first graphic values comprises determining frequencies of occurrence
3 of the various polynary strings of said first normalized multi-dimensional data, and
4 assigning the determined frequencies of occurrence to the corresponding first
5 regionareas within the first recursively partitioned/nested geometric structure as the
6 determined first graphing values of the corresponding first regionareas.

1 7. (Currently Amended) The method of claim 1, wherein said determining of
2 corresponding first graphic values comprises assigning first output values
3 corresponding to the first normalized multi-dimensional data as the determined first
4 graphing values of the corresponding first regionareas within the first recursively
5 partitioned/nested geometric structure.

1 8. (Original) The method of claim 7, wherein said determining of corresponding
2 first graphic values further comprises computing said first output values.

1 9. (Original) The method of claim 8, wherein each of said first normalized multi-
2 dimensional data of said first normalized multi-dimensional data space comprises a
3 polynary string having a plurality of symbols, encoding a plurality of relative
4 coordinate values, and said computing of the first output values comprises
5 for each constituting symbols of a polynary string, summing one or more
6 appearance values corresponding to one or more appearances of the particular

7 symbol in the polynary string, and adding the sum to an average residual relative
8 coordinate value.

1 10. (Original) The method of claim 9, wherein each appearance value
2 corresponding to an appearance of a particular symbol is dependent on the position
3 of the particular appearance of the particular symbol in the polynary string.

1 11. (Original) The method of claim 10, wherein each appearance value
2 corresponding to an appearance of a particular symbol is equal to a positional value
3 associated with the position of the particular appearance in the polynary string.

1 12. (Original) The method of claim 11, wherein
2 each positional value equals to $(1 - F) \times F^{**}(k - 1)$, and
3 the average residual relative coordinate value equals $(1 - F) \times F^{**}K$,
4 where F equals $(n - 1)/n$,

5 k denotes a position in a polynary string,
6 n equals the number of relative coordinate values, and
7 K equals the length of the polynary string.

1 13. (Currently Amended) The method of claim 2, wherein the method further
2 comprises
3 receiving a first zooming specification comprising one or more of said
4 polynary string constituting symbols;
5 excluding a first subset of said first regionareas based at least in part on said
6 received first zooming specification; and
7 repeating said displaying for the remaining ones of said first regionareas in an
8 expanded manner.

1 14. (Currently Amended) The method of claim 13, wherein the method further
2 comprises

3 receiving a second zooming specification comprising one or more additional
4 ones of said polynary string constituting symbols;

5 excluding a second subset of said remaining ones of said first regionareas
6 based at least in part on said received second zooming specification; and
7 repeating said displaying for the remaining ones of said first regionareas.

1 15. (Currently Amended) The method of claim 14, wherein the method further
2 comprises

3 receiving an unzoom specification;
4 restoring the remaining ones of said first regionareas to re-include said
5 excluded second subset of said first regionareas; and
6 repeating said displaying for the remaining ones of said first regionareas.

1 16. (Currently Amended) The method of claim 13, wherein the method further
2 comprises

3 receiving an unzoom specification;
4 restoring the remaining ones of said first regionareas to re-include said
5 excluded first subset of said first regionareas; and
6 repeating said displaying for said first regionareas.

1 17. (Currently Amended) The method of claim 1, wherein said associating
2 comprises for each of said first regionareas, associating a selected one of a plurality
3 of symbols with the regionarea based at least in part on the determined graphing
4 value of the regionarea.

1 18. (Currently Amended) The method of claim 1, wherein said associating
2 comprises for each of said first regionareas, associating a selected one of a plurality
3 of color attributes with the regionarea based at least in part on the determined
4 graphing value of the regionarea.

1 19. (Cancelled)

1 20. (Currently Amended) The method of claim 1, wherein said associating
2 comprises for each of said first regionareas, associating a selected blending of a
3 plurality of colors with the regionarea based at least in part on contributions to the
4 determined graphing value of the regionarea.

1 21. (Currently Amended) The method of claim 1, wherein said first regionareas
2 correspond to all constituting regionareas of the first recursively partitioned/nested
3 geometric structure, said first normalized multi-dimensional data are values of
4 independent variables of a function, and said first graphing values are
5 corresponding values of a dependent variable of the function.

1 22. (Currently Amended) The method of claim 1, wherein the method further
2 comprises
3 identifying a second plurality of regionareas defined by a second plurality of
4 geometric primitives disposed within a second innermost nested level of a second
5 recursively partitioned/nested geometric structure having at least the second
6 plurality of geometric primitives and a second other geometric primitive disposed in
7 a second immediately preceding outer nesting level of the second innermost nested
8 level, with the second plurality of areas defined by the second plurality of geometric

9 primitives nested within a second other area defined by the second other geometric
10 primitive, the second plurality of regionareas that corresponding to a second plurality
11 of normalized multi-dimensional data of a second normalized multi-dimensional data
12 space, and the second recursively partitioned/nested geometric structure being
13 corresponding to the second normalized multi-dimensional data space;
14 determining corresponding second graphing values for said second
15 corresponding regionareas within said second recursively partitioned/nested
16 geometric structure determined for said second normalized multi-dimensional data
17 of said second normalized multi-dimensional data space;
18 associating corresponding second visual attributes with said second
19 corresponding regionareas within said second recursively partitioned/nested
20 geometric structure, based at least in part on corresponding ones of said
21 determined second graphing values; and
22 displaying said second recursively partitioned/nested geometric structure,
23 visually differentiating said second corresponding regionareas based at least in part
24 on corresponding ones of said associated second visual attributes.

1 23. (Original) The method of claim 22, wherein said first and second recursively
2 partitioned/nested geometric structures are displayed in a manner such that both
3 recursively partitioned/nested geometric structures are visible concurrently.

1 24. (Original) The method of claim 23, wherein each of said first and second
2 normalized multi-dimensional data of said first and second normalized multi-
3 dimensional data spaces comprises a polynary string having a plurality of symbols,
4 encoding a plurality of relative coordinate values, the method further comprises
5 receiving a first zooming specification comprising one or more of said
6 polynary string constituting symbols;

7 excluding a first subset of said first regionareas based at least in part on said
8 received first zooming specification;
9 excluding a second subset of said second regionareas based at least part on
10 the removed ones of said first regionareas; and
11 repeating said displaying for the remaining ones of said first and second
12 regionareas.

1 25. (Original) The method of claim 22, wherein said first and second normalized
2 multi-dimensional data are values of first and second input variables.

1 26. (Original) The method of claim 22, wherein said first normalized multi-
2 dimensional data are values of input variables, and said second normalized multi-
3 dimensional data are values of corresponding output variables.

1 27. (Original) The method of claim 1, wherein the method further comprises
2 computing a location for a centroid for each of a plurality primitive elements of the
3 geometric structure.

1 28. (Original) The method of claim 27, wherein coordinates (x_p, y_p) of the location
2 of each centroid is computed as follows:

$$X_p = X_c + R * \sum_{k=1}^K V(N, k) * C(N, m[Lk])$$

$$Y_p = Y_c + R * \sum_{k=1}^K V(N, k) * S(N, m[Lk])$$

5 where:

6 (X_c, Y_c) are coordinate values of the geometric structure's centroid;

7 R is a radius extending from the geometric structure's centroid to an

8 outermost vertex of the geometric structure;

9 $V(N, k)$ is $w^*(1 - w)^{**}(k - 1)$ where $w = 1/(1+\sin(\pi/N))$;
10 $m[L_k]$ is outer vertex number (1, 2, ..., N) assigned to the k th symbol
11 appearing in a corresponding polynary string;
12 $C(N, m[L_k]) = \cos(a^* \pi)$; and
13 $S(N, m[L_k]) = \sin(a^* \pi)$ [where $a = (5*N - 4*m[L_k])/(2*N)$].

1 29. (Original) The method of claim 28, wherein the K values of $V(N, k)$ are
2 computed once responsive to a specification of N.

1 30. (Original) The method of claim 28, wherein at least the N values of $C(N,$
2 $m[L_k]$) or the N values of $S(N, m[L_k])$ are computed once responsive to a
3 specification of N.

1 31. (Withdrawn) A processor implemented data processing method for
2 generating a polynary string representation for an entity defined by n relative
3 coordinate values, n being an integer, comprising:
4 associating n symbolic representations with said n relative coordinate values;
5 and
6 selecting the symbolic representation corresponding to the highest relative
7 coordinate value as the first constituting member of the polynary string
8 representation.

1 32. (Withdrawn) The method of claim 31, wherein the method further comprises
2 computing a constant value (F) by dividing $(n - 1)$ by n; and
3 computing a variable value (G) by subtracting F from 1;

4 subtracting G from the current highest relative coordinate value; and
5 selecting the symbolic representation corresponding to the current highest
6 relative coordinate value as the next constituting member of the polynary string
7 representation.

1 33. (Withdrawn) The method of claim 32, wherein the method further comprises
2 multiplying the current value of G by F;
3 subtracting G from the current highest relative coordinate value; and
4 selecting the symbolic representation corresponding to the current highest
5 relative coordinate value as the next constituting member of the polynary string
6 representation.

1 34. (Withdrawn) The method of claim 33, wherein the method further comprises
2 repeating said multiply, subtracting and selecting operations set forth in claim 29.

1 35. (Withdrawn) The method of claim 31, wherein said symbolic representation
2 comprises a letter.

1 36. (Withdrawn) The method of claim 31, wherein said symbolic representation
2 comprises a special character.

1 37. (Withdrawn) A processor implemented data processing method for
2 generating a relative coordinate value for an constituting variable of an entity, the
3 entity being represented by a polynary string representation having a plurality of
4 symbolic members representing the constituting variables, the method comprising:
5 determining appearance positions of appearance instances of the symbolic
6 members in said polynary string representation;

7 summing positional values corresponding to the appearance instances of the
8 symbolic members in said polynary string representation; and
9 adding the sum to an average residual relative coordinate value.

1 38. (Withdrawn) The method of claim 37, wherein
2 each positional value equals to $(1 - F) \times F^{**}(k - 1)$, and
3 the average residual relative coordinate value equals $(1 - F) \times F^{**}K$,
4 where F equals $(n - 1)/n$,
5 n equals the number of coordinate values,
6 k denotes a position in the polynary string representation; and
7 K equals the length of the polynary string.

1 39. (Currently Amended) An apparatus comprising:
2 storage medium having stored therein programming instructions designed to
3 enable the apparatus to

4 identify a first plurality of regionareas defined by a first plurality of
5 geometric primitives disposed within a first innermost nested level of a
6 first recursively partitioned/nested geometric structure having the first
7 plurality of geometric primitives and a first other geometric primitive
8 disposed in a first immediately preceding outer nesting level of the first
9 innermost nested level, with the first plurality of areas of the first
10 plurality of geometric primitives nested within a first other area defined
11 by the first other geometric primitive, the first plurality of regionareas
12 that corresponding to a first plurality of normalized multi-dimensional
13 data of a first normalized multi-dimensional data space, and the first
14 recursively partitioned/nested geometric structure being corresponding
15 to the first normalized multi-dimensional data space,

16 determine corresponding first graphing values for said first corresponding
17 regionareas within said first recursively partitioned/nested geometric
18 structure determined for said first normalized multi-dimensional data of
19 said first normalized multi-dimensional data space;
20 associate corresponding first visual attributes with said first corresponding
21 regionareas within said first recursively partitioned/nested geometric
22 structure, based at least in part on corresponding ones of said
23 determined first graphing values, including associating for each of said
24 first regions a selected one of a plurality of colored geometric
25 primitives with the region based at least in part on the determined
26 graphing value of the region, and
27 display said first recursively partitioned/nested geometric structure,
28 visually differentiating said first corresponding regionareas based at
29 least in part on corresponding ones of said associated first visual
30 attributes; and
31 at least one processor coupled to the storage medium to execute the
32 programming instructions.

1 40. (Currently Amended) The apparatus of claim 39, wherein each of said first
2 normalized multi-dimensional data of said first normalized multi-dimensional data
3 space comprises a plurality of relative coordinate values, and the programming
4 instructions are further designed to enable the apparatus to construct a polynary
5 string to represent each of said first normalized multi-dimensional data and its
6 corresponding one of said first regionareas within said first recursively
7 partitioned/nested geometric structure in accordance with the relative coordinate
8 values.

1 41. (Original) The apparatus of claim 40, wherein said programming instructions
2 are designed to enable the apparatus to perform said constructing of a polynary
3 string by selecting a symbol as the next symbolic member of the polynary string
4 based on which of the relative coordinate values is the current highest relative
5 coordinate value.

1 42. (Original) The apparatus of claim 41, wherein said programming instructions
2 are further designed to enable the apparatus to perform said constructing of a
3 polynary string by reducing the highest relative coordinate value in by an amount
4 (G), upon each selection, and reducing the amount (G) after each reduction.

1 43. (Original) The apparatus of claim 42, wherein said programming instructions
2 are designed to enable the apparatus to set the amount (G) initially to $1 - F$, and
3 thereafter reduced each time by $G*(1 - F)$, where F equals $(n - 1)/n$, and n equals
4 the number of relative coordinate values.

1 44. (Currently Amended) The apparatus of claim 40, wherein said programming
2 instructions are designed to enable the apparatus to perform said determining by
3 determining frequencies of occurrence of the various polynary strings of said first
4 normalized multi-dimensional data, and assigning the determined frequencies of
5 occurrence to the corresponding first regionareas within the first recursively
6 partitioned/nested geometric structure as the determined first graphing values of the
7 corresponding first regionareas.

1 45. (Currently Amended) The apparatus of claim 39, wherein said programming
2 instructions are designed to enable the apparatus to perform said determining by
3 assigning first output values corresponding to the first normalized multi-dimensional

4 | data as the determined first graphing values of the corresponding first regionareas
5 | within the first recursively partitioned/nested geometric structure.

1 | 46. (Original) The apparatus of claim 45, wherein said programming instructions
2 | are further designed to enable the apparatus to perform said determining by
3 | computing said first output values.

1 | 47. (Original) The apparatus of claim 46, wherein each of said first normalized
2 | multi-dimensional data of said first normalized multi-dimensional data space
3 | comprises a polynary string having a plurality of symbols, encoding a plurality of
4 | relative coordinate values, and said programming instructions are designed to
5 | enable the apparatus to perform said computing by
6 | summing one or more appearance values corresponding to one or more
7 | appearances of the particular symbol in a polynary string, and adding the sum to an
8 | average residual relative coordinate value, and
9 | repeating said summing and adding for each constituting symbols of the
10 | polynary string.

1 | 48. (Original) The apparatus of claim 47, wherein each appearance value
2 | corresponding to an appearance of a particular symbol is dependent on the position
3 | of the particular appearance of the particular symbol in the polynary string.

1 | 49. (Original) The apparatus of claim 48, wherein each appearance value
2 | corresponding to an appearance of a particular symbol is equal to a positional value
3 | associated with the position of the particular appearance in the polynary string.

1 | 50. (Original) The apparatus of claim 49, wherein

2 each positional value equals to $(1 - F) \times F^{**}(k - 1)$, and
3 the average residual relative coordinate value equals $(1 - F) \times F^{**}K$,
4 where F equals $(n - 1)/n$,
5 k denotes a position in a polynary string,
6 n equals the number of relative coordinate values, and
7 K equals the length of the polynary string.

1 51. (Currently Amended) The apparatus of claim 40, wherein said programming
2 instructions are further designed to enable the apparatus to
3 receive a first zooming specification comprising one or more of said polynary
4 string constituting symbols;
5 exclude a first subset of said first regionareas based at least in part on said
6 received first zooming specification; and
7 repeat said displaying for the remaining ones of said first regionareas in an
8 expanded manner.

1 52. (Currently Amended) The apparatus of claim 51, wherein said programming
2 instructions are further designed to enable the apparatus to
3 receive a second zooming specification comprising one or more additional
4 ones of said polynary string constituting symbols;
5 exclude a second subset of said remaining ones of said first regionareas
6 based at least in part on said received second zooming specification; and
7 repeat said displaying for the remaining ones of said first regionareas.

1 53. (Currently Amended) The apparatus of claim 52, wherein said programming
2 instructions are designed to enable the apparatus to
3 receive an unzoom specification;

4 restore the remaining ones of said first regionareas to re-include said
5 excluded second subset of said first regionareas; and
6 repeat said displaying for the remaining ones of said first regionareas.

1 54. (Currently Amended) The apparatus of claim 51, wherein said programming
2 instructions are further designed to enable the apparatus to
3 receive an unzoom specification;
4 restore the remaining ones of said first regionareas to re-include said
5 excluded first subset of said first regionareas; and
6 repeat said displaying for said first regionareas.

1 55. (Currently Amended) The apparatus of claim 39, wherein said programming
2 instructions are designed to enable the apparatus to perform said associating by
3 associating, for each of said first regionareas, a selected one of a plurality of
4 symbols with the regionarea based at least in part on the determined graphing value
5 of the regionarea.

1 56. (Currently Amended) The apparatus of claim 39, wherein said programming
2 instructions are designed to enable the apparatus to perform said associating by
3 associating, for each of said first regionareas, a selected one of a plurality of color
4 attributes with the regionarea based at least in part on the determined graphing
5 value of the regionarea.

1 57. (Cancelled)

1 58. (Currently Amended) The apparatus of claim 39, wherein said programming
2 instructions are designed to enable the apparatus to perform said associating by

3 associating, for each of said first regionareas, a selected blending of a plurality of
4 colors with the regionarea based at least in part on contributions to the determined
5 graphing value of the regionarea.

1 59. (Currently Amended) The apparatus of claim 39, wherein said first
2 regionareas correspond to all constituting regionareas of the first recursively
3 partitioned/nested geometric structure, said first normalized multi-dimensional data
4 are values of independent variables of a function, and said first graphing values are
5 corresponding values of a dependent variable of the function.

1 60. (Currently Amended) The apparatus of claim 39, wherein said programming
2 instructions are further designed to enable the apparatus to
3 identify a second plurality of regionareas defined by a second plurality of
4 geometric primitives disposed within a second innermost nested level of a second
5 recursively partitioned/nested geometric structure having at least the second
6 plurality of geometric primitives and a second other geometric primitive disposed in
7 a second immediately preceding outer nesting level of the second innermost nested
8 level, with the second plurality of areas defined by the second plurality of geometric
9 primitives nested within a second other area defined by the second other geometric
10 primitive, the second plurality of regionareas that correspond to a second plurality
11 of normalized multi-dimensional data of a second normalized multi-dimensional data
12 space, and the second recursively partitioned/nested geometric structure being
13 corresponding to the second normalized multi-dimensional data space;
14 determine corresponding second graphing values for said second
15 corresponding regionareas within said second recursively partitioned/nested
16 geometric structure determined for said second normalized multi-dimensional data
17 of said second normalized multi-dimensional data space;

18 associate corresponding second visual attributes with said second
19 | corresponding regionareas within said second recursively partitioned/nested
20 | geometric structure, based at least in part on corresponding ones of said
21 | determined second graphing values; and
22 display said second recursively partitioned/nested geometric structure,
23 | visually differentiating said second corresponding regionareas based at least in part
24 | on corresponding ones of said associated second visual attributes.

1 61. (Original) The apparatus of claim 60, wherein said first and second
2 recursively partitioned/nested geometric structures are displayed in a manner such
3 that both recursively partitioned/nested geometric structures are visible concurrently.

1 62. (Currently Amended) The apparatus of claim 61, wherein each of said first
2 and second normalized multi-dimensional data of said first and second normalized
3 multi-dimensional data spaces comprises a polynary string having a plurality of
4 symbols, encoding a plurality of relative coordinate values, said programming
5 instructions are further designed to enable the apparatus to
6 receive a first zooming specification comprising one or more of said polynary
7 string constituting symbols;
8 exclude a first subset of said first regionareas based at least in part on said
9 received first zooming specification;
10 exclude a second subset of said second regionareas based at least part on
11 the removed ones of said first regionareas; and
12 repeat said displaying for the remaining ones of said first and second
13 regionareas.

1 63. (Original) The apparatus of claim 60, wherein said first and second
2 normalized multi-dimensional data are values of first and second input variables.

1 64. (Original) The apparatus of claim 60, wherein said first normalized multi-
2 dimensional data are values of input variables, and said second normalized multi-
3 dimensional data are values of corresponding output variables.

1 65. (Original) The apparatus of claim 39, wherein said apparatus is a selected
2 one of a palm sized processor based device, a notebook computer, a desktop
3 computer, a set-top box, a single processor server, a multi-processor server, and a
4 collection of coupled servers.

1 66. (Previously presented) The apparatus of claim 39, wherein said programming
2 instructions are further designed to compute a location for a centroid for each of a
3 plurality of primitive elements of the geometric structure.

1 67. (Original) The apparatus of claim 66, wherein said programming instructions
2 are designed to compute coordinates (x_p, y_p) of the location of each centroid as
3 follows:

4
$$X_p = X_c + R * \sum_{k=1}^K V(N, k) * C(N, m[Lk])$$

5
$$Y_p = Y_c + R * \sum_{k=1}^K V(N, k) * S(N, m[Lk])$$

6 where:

7 (X_c, Y_c) are coordinate values of the geometric structure's centroid;

8 R is a radius extending from the geometric structure's centroid to an
9 outermost vertex of the geometric structure;

10 $V(N, k)$ is $w^*(1 - w)^{**}(k - 1)$ where $w = 1/(1+\sin(\pi/N))$;
11 $m[L_k]$ is outer vertex number (1, 2, ..., N) assigned to the kth symbol
12 appearing in a corresponding polynary string;
13 $C(N, m[L_k]) = \cos(a * \pi)$; and
14 $S(N, m[L_k]) = \sin(a * \pi)$ [where $a = (5*N - 4*m[L_k])/(2*N)$].

1 68. (Original) The apparatus of claim 67, wherein said programming instructions
2 are designed to compute the K values of $V(N, k)$ once responsive to a specification
3 of N.

1 69. (Original) The method of claim 67, wherein said programming instructions are
2 designed to compute at least the N values of $C(N, m[L_k])$ or the N values of $S(N,$
3 $m[L_k])$ once responsive to a specification of N.

1 70. (Withdrawn) An apparatus comprising
2 storage medium having stored therein programming instructions designed to
3 enable the apparatus to
4 associate n symbolic representations with said n relative coordinate
5 values, and
6 select the symbolic representation corresponding to the highest
7 relative coordinate value as the first constituting member of the
8 polynary string representation; and
9 at least one processor coupled to the storage medium to execute the
10 programming instructions.

1 71. (Withdrawn) The apparatus of claim 70, wherein the programming
2 instructions further enable the apparatus to
3 compute a constant value (F) by dividing $(n - 1)$ by n; and
4 compute a variable value (G) by subtracting F from 1;
5 subtract G from the current highest relative coordinate value; and
6 select the symbolic representation corresponding to the current highest
7 relative coordinate value as the next constituting member of the polynary string
8 representation.

1 72. (Withdrawn) The apparatus of claim 71, wherein the programming
2 instructions further enable the apparatus to
3 multiply the current value of G by F;
4 subtract G from the current highest relative coordinate value; and
5 select the symbolic representation corresponding to the current highest
6 relative coordinate value as the next constituting member of the polynary string
7 representation.

1 73. (Withdrawn) The apparatus of claim 72, wherein the programming
2 instructions further enable the apparatus to repeat said multiplying, subtracting and
3 selecting operations set forth in claim 64.

1 74. (Withdrawn) The apparatus of claim 70, wherein said symbolic representation
2 comprises a letter.

1 75. (Withdrawn) The apparatus of claim 70, wherein said symbolic representation
2 comprises a special character.

1 76. (Withdrawn) The apparatus of claim 70, wherein said apparatus is a selected
2 one of a palm sized processor based device, a notebook computer, a desktop
3 computer, a set-top box, a single processor server, a multi-processor server, and a
4 collection of coupled servers.

1 77. (Withdrawn) An apparatus comprising:
2 storage medium having stored therein a plurality of programming instructions
3 designed to enable the apparatus to
4 determine appearance positions of appearance instances of symbolic
5 members of a polynary string representation of an entity having a
6 number of constituting variables, the symbolic members being
7 corresponding to the constituting variables,
8 sum positional values corresponding to the appearance instances of the
9 symbolic members in said polynary string representation, and
10 add the sum to an average residual relative coordinate value; and
11 at least one processor coupled to the storage medium to execute the
12 programming instructions.

1 78. (Withdrawn) The apparatus of claim 77, wherein
2 each positional value equals to $(1 - F) \times F^{**}(k - 1)$; and
3 the average residual relative coordinate value equals $(1 - F) \times F^{**}K$,
4 where F equals $(n - 1)/n$,
5 n equals the number of coordinate values,
6 k denotes a position in the polynary string representation; and
7 K denotes the length of the polynary string.

1 79. (Withdrawn) The apparatus of claim 77, wherein said apparatus is a selected
2 one of a palm sized processor based device, a notebook computer, a desktop
3 computer, a set-top box, a single processor server, a multi-processor server, and a
4 collection of coupled servers.

5

1 80. (New) The method of claim 1, wherein the method further comprises
2 selecting the geometric primitives.

3

1 81. (New) The apparatus of claim 39, wherein the programming instructions are
2 further designed to enable the apparatus to select the geometric primitives.

3